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HERMES PATHFINDER: SCIENTIFIC GOALS AND DATA HANDLING.

Abstract

HERMES Pathfinder is a constellation of six 3U nano-satellites mainly funded by the Italian Space Agency (ASI), with the contribution of the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 821896. The six satellites are distributed in low Earth orbit and host simple but innovative detectors, sensitive from X-rays of ~ 2 keV to soft gamma rays of ~ 1 -2 MeV and with a high time resolution of the order of 300 ns. The HERMES mission concept implements an all-sky monitor to catch bright high-energy transients such as Gamma-Ray Bursts (GRB) candidate electromagnetic counterparts of gravitational wave signals, as in the case of the GRB170817A event. HERMES will localize the Gamma-Ray Bursts by the measurements of the delays between GRB signal arrival times on at least 3 satellites and will allow to investigate for the first time the temporal structure of

GRBs down to a few μs , to constrain models for the GRB engine. The constellation will be launched in the first half of 2025, but since 1 December 2023 the first HERMES payload has been flying in low Earth Sun-synchronous orbit on board the Australian SpIRIT mission. The science data will be processed, archived and analysed at the ASI Space Science Data Center (ASI-SSDC), which hosts the HERMES Scientific Operation Center (SOC). The SOC is responsible for archiving, generating, validating, and distributing scientific and ancillary data, for quick-look analysis, mission planning, GRB trigger alerts, calibration data and data-analysis software. SSDC has developed specific pipelines to automatically process and apply calibrations to raw telemetry data received from the HERMES mission operation center (MOC) for both quick-look analysis and generation of the official scientific data archive. On behalf of the HERMES Pathfinder collaboration I will present the main scientific goals of the mission and the SOC infrastructure.